

found by which the deeper pits could be protected from the action, corrosion by acid could be used in substitution for a large part of the usual process of polishing.

In connection with experiments of this sort, trial was made of the action of the acid upon finely ground glass, such, for example, as is used as a backing for stereoscopic transparencies, and very curious results were observed. For this purpose the acid may conveniently be used much stronger, say one part of commercial acid to ten parts of water, and the action may be prolonged for hours or days. The general appearance of the glass after treatment is smoother and more translucent, but it is only under the microscope that the remarkable changes which the surface has undergone become intelligible. Fig. 3 is from a photograph taken in the microscope, the focus being upon the originally ground surface itself. The whole area is seen to be divided into cells. These cells increase as the action progresses, the smaller ones being, as it were, eaten up by the bigger. The division lines between the cells are *ridges*, raised above the general level, and when seen in good focus appear absolutely sharp. The general surface within the cells shows no structure, being as invisible as if highly polished.

That each cell is, in fact, a concave lens, forming a separate image of the source of light, is shown by slightly screwing out the object-glass. Fig. 4 was taken in this way from the same surface, the source of light being the flame of a paraffin lamp, in front of which was placed a cross cut from sheet-metal.

The movement required to pass from the ridge to the image of the source, equal to the focal length (f) of the lens, may be utilised to determine the depth (l) of a cell. In one experiment the necessary movement was .005 inch. The semi-aperture (y) of the "lens" was .0015 inch, whence by the formula $y^2 = fl$, we find $l = .00045$ inch. This represents the depth of the cell, and it amounts to about 8 wave-lengths of yellow light.

The action of the acid seems to be readily explained if we make the very natural supposition that it eats in everywhere, at a fixed rate, normally to the actual surface. If the amount of the normal corrosion after a proposed time be known, the new surface can be constructed as the "envelope" of spheres having the radius in question and centres distributed over the old surface. Ultimately, the new surface becomes identified with a series of spherical segments having their centres at the deeper pits of the original surface. The construction is easily illustrated in the case of two dimensions. In the figure (Fig. 5) A is supposed to be the original surface; B, C, D, E surfaces formed by corrosion, being constructed by circles having their centres on A. In B the ridges are still somewhat rounded, but they become sharp in D and E. The general tendency is to sharpen elevations and to smooth off depressions.

THE FUNCTIONS OF A UNIVERSITY.¹

THE word University has borne many significations; and, indeed, its functions are various, and the signification attached to the word has depended on the particular point of view taken at the time. An eminent German, who visited me some years ago, made the remark after seeing University College:—"Aber, lieber Herr College, University College ist eine kleine Universität." So it is; for it fulfils most of the functions of the most successful Universities in the world. And why is this? Because the traditions of University College have always been, that it is not merely a place where known facts and theories should be administered in daily doses to young men and young women, but that the duties of the professors, assistant-professors, teachers and advanced students is to increase knowledge. That is the chief function of a University—to increase knowledge. But it is not the only one.

A University has always been regarded as a training school for the "learned professions," *i.e.* for theology, law and medicine. The terms of our charter have excluded the first of these branches of knowledge. Founded as it was in the '20's, when admission to Oxford or Cambridge involved either belief in the tenets of the Church of England or insincerity, it was not possible to provide courses in theology which should be acceptable to Non-conformists, Jews and others who desired education. On the whole, it appears to me better that a subject about which so much difference of opinion exists should be taught in a sepa-

rate institution. There are many branches of knowledge which can be adequately discussed without intruding into any sphere of religious controversy; and, indeed, it would be difficult, I imagine, to treat mathematics or chemistry from a sectarian standpoint. I at least have never tried. There are subjects which may be placed on the border-line, for example, philosophy; but such subjects, and they are few in number, might well form part of the curriculum of the theological college, if thought desirable. It is a thousand pities that instead of founding King's College a theological college had not been established in the immediate neighbourhood of University College; it would have strengthened us, and it would have tended, too, to the advantage of the Church of England. However, what is done can't be undone; and let us wish all prosperity to our sister College, and a long and a useful life. We are now friends, and have been friends for many years. May that friendship long continue!

Dismissing the faculty of theology, therefore, as out of our power, as well as beyond our wishes, let us turn to the remaining two learned professions. University College, I believe, was the first place in England where a systematic legal education could be obtained. Our chairs of Roman law, constitutional law and jurisprudence were the first to be established in England, although such chairs had for long been known on the Continent, and in Scotland. "Imitation is the sincerest flattery," and in the fulness of time the Inns of Court started a school of their own. Our classes, which used to be crowded, dwindled, and our law-school is certainly not our strongest feature. I am not sufficiently acquainted with English legal education to pronounce an opinion as to whether methods of training as they at present exist in England are the most effective; I have heard rumours that they are not. That must be left to specialists to decide. But arguing from the experience of another faculty, in which the apprenticeship system once existed, and which has changed that system with a view to reform, and judging, too, from the experience abroad and in Scotland, I venture to think that some improvement in legal education is possible. If that opinion is correct, it is surely not too much to hope that the claims of University College may be considered as having made the first attempt to systematise legal education in England.

The faculty of medicine has existed in a flourishing state since the inception of University College. Not long after the College was built, the Hospital buildings, of which we have the last unsightly remains still before our eyes, were erected. One of my predecessors on a similar occasion to this has given you an entrancing account of the early history of this side of the College, and has discoursed on the eminent men who filled the chairs in the medical faculty. Here young men whose intention it is to enter the medical profession are trained; they now receive five years' instruction in the various branches of knowledge bearing on their important calling. I would point out that this function of a University is professedly a technical one—the training of medical men. True, many researches have been made by the eminent men who have held chairs in this faculty; but that is not the primary duty of such men; their duty is to train others to exercise a profession. If they advance their subject in doing so, so much the better; it increases the fame of the school, it imparts enthusiasm to their students, and in many cases their discoveries have been of unspeakable benefit to the human race. In a certain sense, every medical man is an investigator; the first essential is that he shall be able to make a correct diagnosis; the next, that he shall prescribe correct treatment. But novelty is not essential; few men evolve new surgical operations or introduce new remedies, and though we have in the past had not a few such, they are not essential for a successful medical school, the object of which is to train good practical working physicians and surgeons. The teaching staff of the medical faculty must of necessity be almost all engaged in practice, and, indeed, it would be unfortunate for their students if they were merely theoretical teachers. Let me again recapitulate my point; the medical faculty is essentially a technical faculty; the hospital is its workshop.

In England, of recent years, schools of engineering have been attached to the Universities. Abroad and in America they are separate establishments, and are sometimes attached to large engineering shops, where the pupils pursue their theoretical and practical studies together, taking the former in the morning, the latter in the afternoon. Here again the subject is a professional

¹ Oration delivered at University College, London, on June 6, by Prof. W. Ramsay, F.R.S.

one. The object of the student is to become a practical engineer, and all his work is necessarily directed to that end. Like other workers in different fields, his aim is the acquisition and utilisation of "power," but in his case it is his object to direct mechanical and electrical power so as to add to the convenience of the public. A machine is an instrument for converting heat or electrical energy into what is termed "kinetic energy," and it is with the laws and modes of this conversion that he has to deal. Such abstract sciences as chemistry, physics and geology, therefore, are studied as means to an end, not for their own sakes. They afford him a glimpse of the principles on which his engineering practice is based; and mathematics is essential in order that he may be able to apply physical principles to the practical problems of his profession.

We see, then, that a University, as it at present exists, provides, or may provide, technical instruction for theologians, for lawyers, for medical men and for engineers. It is, in fact, an advanced technical school for these subjects.

But it is more, and I believe that its chief function lies in the kind of work which I shall attempt now to describe. The German Universities possess what they term a "philosophical faculty"; and this phrase is to be accepted in the derivational meaning of the word—a faculty which befriends wisdom or learning. The watchword of the members of this faculty is research; the searching out the secrets of nature, to use a current phrase, or the attempt to create new knowledge. The whole machinery of the philosophical faculty is devised to achieve this end; the selection of the teachers, the equipment of the laboratories and libraries, the awarding of the degrees.

What are the advantages of research? Much is heard nowadays regarding the necessity of State-provision for its encouragement, and the Government places at the disposal of the Royal Society a sum of no less than 4000*l.* a year, which is distributed in the form of grants to applicants who are deemed suitable by committees appointed to consider their claims to assistance.

There are two views regarding the advantage of research which have been held. The first of these may be termed the utilitarian view. You all know the tale of the man of science who was asked the use of research and who parried with the question—What is the use of a baby? Well, I imagine that one school of political economists would oppose the practice of child-murder on the ground that potentially valuable property was being destroyed. These persons would probably not be those who stood to the baby in a parental relation. Nor are the most successful investigators those who pursue their inquiries with the hope of profit, but for the love of them. It is, however, a good thing, I believe, that the *profanum vulgus* should hold the view that research is remunerative to the public—as some forms of it undoubtedly are.

The second view may be termed the philosophical one. It is one held by lovers of wisdom in all its various forms. It explains itself, for the human race is differentiated from the lower animals by the desire which it has to know "why." You may have noticed, as I have, that one of the first words uttered by that profound philosopher, a small child, is "why." Indeed, it becomes wearisome by its iteration. We are the superiors of the brutes in that we can hand down our knowledge. It may be that some animals also seek for knowledge; but at best it is of use to themselves alone; they cannot transmit it to their posterity, except, possibly, by the way of hereditary faculties. We, on the contrary, can write and read; and this places us, if we like, in the possession of the accumulated wisdom of the ages.

Now the most important function, I hold, of a University is to attempt to answer that question, "why?" The ancients tried to do so; but they had not learned that its answer must be preceded by the answer to the question, "how?" and that in most cases—indeed in all—we must learn to be contented with the answer to "how?" The better we can tell *how* things are, the more nearly shall we be able to say *why* they are.

Such a question is applicable to all kinds of subjects; to what our forerunners on this earth did; how they lived; if we go even further back, what preceded them on the earth. The history of these inquiries is the function of geology, palæontology and palæontological botany; it is continued through archæology, Egyptian and Assyrian, Greek and Roman; it evolves into history, and lights are thrown on it by languages and philology; it dovetails with literature and economics. In

all these, research is possible; and a University should be equipped for the successful prosecution of inquiries in all such branches.

Another class of inquiries relates to what we think and how we reason; and here we have philosophy and logic. A different branch of the same inquiry leads us to mathematics, which deals with spatial and numerical concepts of the human mind, geometry and algebra. By an easy transition we have the natural sciences; those less closely connected with ourselves as persons, but intimately related to our surroundings. Zoology and botany, anatomy, physiology and pathology deal with living organisms as structural machines, and they are based on physics and chemistry, which are themselves dependent on mathematics.

Such inquiries are worth making for their own sakes. They interest a large part of the human race, and not to feel interested in them is to lack intelligence. The man who is content to live from day to day, glad if each day will but produce him food to eat and a roof to sleep under, is but little removed from an uncivilised being. For the test of civilisation is *prevision*; care to look forward; to provide for to-morrow; the to-morrow of the race, as well as the to-morrow of the individual; and he who looks furthest ahead is best able to cope with nature, and to conquer her.

The investigation of the unknown is to gather experience from those who have lived before us, and to secure knowledge for ourselves and for those who will succeed us. I see, however, that I am insensibly taking a utilitarian view; I by no means wish to exclude it, but the chief purpose of research must be the acquisition of knowledge, and the second its utilisation.

I will try to explain why this is so, and here you must forgive me if I cite well-known and oft-quoted instances.

If attempts were made to discover only useful knowledge (and by useful I accept the vulgar definition of profitable, *i.e.* knowledge which can be directly transmitted into its money equivalent) these attempts would, in many, if not in most, cases fail of their object. I do not say that once a principle has been proved and a practical application is to be made of it that the working out of the details is not necessary. But that is best done by the practical man, be he the parson, the doctor, the engineer, the technical electrician or the chemist, and best of all on a fairly large scale. If, however, the practical end is always kept in view, the chances are that there will be no advance in principles. Indeed, what we investigators wish to be able to do, and what in many cases we can do, although perhaps very imperfectly, is to prophesy, to foretell what a given combination of circumstances will produce. The desire is founded on a belief in the uniformity of nature; on the conviction that what has been will again be, should the original conditions be reproduced. By studying the consequences of varying the conditions our knowledge is extended; indeed, it is sometimes possible to go so far as to predict what will happen under conditions, all of which have never before been seen to be present together.

When Faraday discovered the fact that when a magnet is made to approach a coil of wire an electric current is induced in that wire, he made a discovery which at the time was of only scientific interest. That discovery has resulted in electric light, electric traction and the utilisation of electricity as a motive power; the development of a means of transmitting energy, of which we have by no means seen the end; nay, we are even now only at its inception, so great must the advance in its utilisation ultimately become.

When Hofmann set Perkin as a young student to investigate the products of oxidation of the base aniline, produced by him from coal-tar, it would have been impossible to have predicted that one manufactory alone would possess nearly 400 large buildings and employ 5000 workmen, living in its own town of 25,000 inhabitants, all of which is devoted to the manufacture of colours from aniline and other coal-tar products. In this work alone at least 350 chemists are employed, most of whom have had a University training.

Schönbein, a Swiss schoolmaster interested in chemistry, was struck by the action of nitric acid on paper and cotton. He would have been astounded if he had been told that his experiments would have resulted in the employment of his nitro-celluloses in colossal quantity for blasting, and for ordnance of all kinds, from the 90-ton gun to the fowling-piece.

But discoveries such as these, which lead directly to practical results, are yet far inferior in importance to others in which a

general principle is involved. Joule and Robert Mayer, who proved the equivalence of heat and work, have had far more influence on succeeding ages than even the discoverers above mentioned, for they have imbued a multitude of minds with a correct understanding of the nature of energy and the possibility of converting it economically into that form in which it is most directly useful for the purpose in view. They have laid the basis of reasoning for *machines*; and it is on machines, instruments for converting unavailable into available energy, that the prosperity of the human race depends.

You will see from these instances that it is in reality "philosophy" or a love of wisdom which, after all, is most to be sought after. Like virtue, it is its own reward; and as we all hope is the case with virtue too, it brings other rewards in its train, not, be it remarked, always to the philosopher, but to the race. Virtue, pursued with the direct object of gain, is a poor thing; indeed, it can hardly be termed virtue if it is dimmed by a motive. So philosophy, if followed after for profit, loses its meaning.

But I have omitted to mention another motive which makes for research; it is a love of pleasure. I can conceive no pleasure greater than that of the poet—the maker—who wreathes beautiful thoughts with beautiful words; but next to this I would place the pleasure of discovery, in whatever sphere it be made. It is a pleasure, not merely to the discoverer, but to all who can follow the train of his reasoning. And after all, the pleasure of the human race, or of the thinking portion of it, counts for a good deal in this life of ours.

To return. Attempts at research, guided by purely utilitarian motives, generally fail in their object, or at least are not likely to be so productive as research without ulterior motive. I am strengthened in this conclusion by the verdict of an eminent German who has himself put the principle into practice; who after following out a purely theoretical line of experiment, which at first appeared remote from profit, has been rewarded by its remunerative utilisation. He remarked, incidentally, that the professors in polytechnika—(what we should term technical colleges, intended to prepare young men for the profession of engineering and technical chemistry)—were less known for their influence on industry than University professors. The aim is different in the two cases; the polytechnika train men for a profession, the philosophical faculty of German Universities aims at imparting a love of knowledge; and, as a matter of fact, the latter *pay* in their influence on the prosperity of the nation better than the former. And this brings me to the fundamental theme of my oration. It is this:—That the best preparation for success in any calling is the training of the student in methods of research. This should be the goal to be clearly kept in view by all teachers in the philosophical faculties of Universities. They should teach with this object:—to awaken in their students a love of their subject and a consciousness that if he persevere, he, too, will be able to extend its bounds.

Of course, it is necessary for the student to learn, so far as is possible, what has already been done. I would not urge that a young man should not master, or at all events learn, a great deal of what has been already discovered before he attempts to soar on his own wings. But there is all the difference in the world between the point of view of the student who reads in order to qualify for an examination, or to gain a prize or a scholarship, and the student who reads because he knows that thus he will acquire knowledge which may be used as a basis of new knowledge. It is that spirit in which our Universities in England are so lamentably deficient; it is that spirit which has contributed to the success of the Teutonic nations, and which is beginning to influence the United States. For this condition of things our examinational system is largely to blame; originally started to cure the abuses of our Civil Service, it has eaten into the vitals of our educational system like a canker, and it is fostered by the further abuse of awarding scholarships as the results of examinations. The pauperisation of the richer classes is a crying evil; it must some day be cured. Let scholarships be awarded to those who need them, not to those whose fathers can well afford to pay for the education of their children. "Pot-hunting" and philosophy have absolutely nothing in common.

It follows that the teachers in the philosophical faculty should be selected only from those who are themselves contributing to the advancement of knowledge; for if they have not the spirit of research in them, how shall they instil it into others? It is our

carelessness in this respect (I do not speak of University College, which has always been guided by these principles, but of our country as a whole) which has made us so backward as compared with some other nations. It is this which has made the vast majority of our statesmen so careless, because so ignorant, of the whole frame of mind of the philosopher, and which has made it possible for a man high in the political estimation of his countrymen to address on a recent occasion the remarks which he did to graduates of our University. It is true that one of the functions of a University is to "train men and women fit for the manifold requirements of the Empire;" that we should all heartily acknowledge; but no man who has any claim to University culture can possibly be contented if the University does not annually produce much work of research. It is its chief excuse for existence; a University which does not increase knowledge is no University; it may be a technical school, it may be an examining board, it may be a coaching establishment, but it has no claim to the name University. The best way of fitting young men for the manifold requirements of the Empire is to give them the power of advancing knowledge.

It may be said that many persons are incapable of exhibiting originality. I doubt it. There are many degrees of originality, as there are many degrees in rhyming, from the writer of doggerel to the poet, or many degrees of musical ear, from the man who knows two tunes, the tune of "God Save the King" and the *other* tune, to the accomplished musician. But in almost all cases, if caught young the human being can be trained, more or less, and, as a matter of fact, natural selection plays its part. Those young men and women who have no natural aptitude for such work—and they are usually known by the lack of interest which they take in it—do not come to the University. My experience is that the majority, or at least a fair percentage of those who do come, possess germs of the faculty of originating, germs capable of development, in many instances, to a very high degree. It is such persons who are of most value to the country; it is from them that advance in literature and in science is to be expected, and many of them will contribute to the commercial prosperity of the country. We hear much nowadays of technical education; huge sums of money are being annually expended on the scrappy scientific education in evening classes of men who have passed a hard day in manual labour, men who lack the previous training necessary to enable them to profit by such instruction. It may be that it is desirable to provide such intellectual relaxation; I even grant that such means may gradually raise the intellectual level of the country; but the investment of money in promoting such schemes is not the one likely to bear the most immediate and remunerative fruit. The Universities should be the technical schools; for the man who has learned to investigate can bring his talents to bear on any subject brought under his notice, and it is on the advance, and not the mere dissemination, of knowledge that the prosperity of a country depends. To learn to investigate requires a long and hard apprenticeship; the power cannot be acquired by an odd hour spent now and again; it is as difficult to become a successful investigator as a successful barrister or doctor, and it requires at least as hard application and as long a period of study.

I do not believe that it is possible for young men or women to devote sufficient time during the evening to such work. Those who devote their evening hours to study and investigation do not bring fresh brains to bear on the subject; they are already fatigued by a long day's work; and, moreover, it is the custom in most of the colleges which have evening classes to insist upon their teachers doing a certain share of day work; they, too, are not in a fit state to direct the work of their pupils or to make suggestions as to the best method of carrying it out. Moreover, the official evening class is from 7 to 10 o'clock, and for investigation in science a spell of three hours at a time is barely sufficient to carry out successfully the end in view; indeed, an eight hours' day might profitably be lengthened into a twelve hours' day, as it not infrequently is. It is heartrending in the middle of some important experiment to be obliged to close and postpone it till a future occasion, when much of the work must necessarily be done over again.

These are some of the reasons why I doubt whether University education, in the philosophical faculty at least, can be successfully given by means of evening classes.

Although my work has lain almost entirely in the domain of science, I should be the last man not to do my best to encourage research in the sphere of what is generally called "arts." In Germany of recent years a kind of institution has sprung up which is termed a *Seminar*. The word may be translated a "literary laboratory." I will endeavour to give a short sketch on the way in which these literary laboratories are conducted. After the student has attended a course of lectures on the subjects to which he intends to devote himself and is ripe for research, he enters a Seminar, in which he is provided with a library, paper, pens and ink and a subject. The method of using the library is pointed out to him, and he is told to read books which bear on the particular subject in question; he is made to collate the information which he gains by reading, and to elaborate the subject which is given him. Naturally his first efforts must be crude, but "*c'est le premier pas qui coûte*." It probably costs him blame at the hands of his instructor; after a few unsuccessful efforts, however, if he has any talent for the particular investigation to which he has devoted himself, his efforts improve and at last he produces something respectable enough to merit publication. Thus he is exposed to the criticism of those best competent to judge, and he is launched in what may be a career in historical, literary or economic research.

Such a Seminar is carried on in philological and linguistic studies, in problems of economy involving statistics, in problems of law involving judicial decision, and of history in which the relations between the development of the various phases in the progress of nations is traced. The system is borrowed from the well-known plan of instruction in a physical or chemical laboratory. Experiments are made in literary style. These experiments are subjected to the criticism of the teacher, and thus the investigator is trained. But it may be objected that the youths who frequent our Universities have not a sufficient knowledge of facts connected with such subjects to be capable of at once entering on a training of this kind. That may be so; if it is the case, our schools must look to it that they provide sufficient training. Even under present circumstances, however, I do not think I am mistaken in supposing that a young man or woman who enters a University at the age of eighteen years with the intention of spending three years in literary or historical studies will not at the end of the second year be more benefited by a course at the Seminar, even though it should result in no permanent addition to literature or history, than if he were to spend his time in mere assimilation. It is not the act of gaining knowledge which profits, it is the power of using it, and while in order to use knowledge it is necessary to gain it, yet a training in the method of using knowledge is much more important and profitable than a training in the method of gaining it. I do not know whether there exists in this country a single example of the continental Seminar; there was some talk of founding such a literary laboratory in University College, but, as usual, the attempt was frustrated by a lack of funds; the attempt would also have been frustrated by the requirements of the present system of examination in the University of London; but there is, fortunately, good hope of changing that system and of developing the minds of students on those lines which have proved so fruitful where they have been systematically followed.

Many, I suppose, who are at present listening to me would be disappointed were I not to refer to the functions of a University with reference to examinations. A long course of training, lasting now for the best part of seventy years, has convinced the population of London that the chief function of a University is to examine. Believe me, the examination should play only a secondary part in the work of a University. It is necessary to test the acquirements of the students whom the teachers have under their charge, but the examination should play an entirely subordinate part. To aim at success in examinations is, unfortunately, too often the goal which the young student aims at, but it is one which all philosophical teachers deprecate. To infuse into his pupils a love of the subject which both are at the same time teaching and learning is the chief object of an enthusiastic teacher; there should be an atmosphere of the subject surrounding them—an umbra—perhaps I should call it an aura; for it should exert no depressing influence upon them. The object of both classes

of students (for I count the teacher a student) should be to do their best to increase knowledge of the subject on which they are engaged. That this is possible many teachers can testify to by experience; and it is the chief lesson learned by a sojourn in a German laboratory. Where each student is himself engaged in research, interest is taken by the students in each others' work; numerous discussions are raised regarding each questionable point; and the combined intelligence of the whole laboratory is focussed on the elucidation of some difficult problem. There is nothing more painful to witness than a dull and decorous laboratory, where each student keeps to his own bench, does not communicate with his fellow-students, does not take an interest in their work and expects them to manifest no interest in his. It is only by friction that heat can be produced, and heat, by increasing the frequency of vibration, results, as we know, in light.

The student should look forward to his examination, not as a solemn ordeal which he is compelled to go through with the prospect of a degree should he be successful, but as a means of showing his teacher and his fellows how much he has profited by the work which he has done; those who pursue knowledge in this spirit and those, be it remarked, who examine in this spirit will look forward to examination with no apprehension; not, perhaps, with joy, for after all it is a bore to be examined and perhaps a still greater bore to examine, but it is a necessary step for the student in gaining self-assurance and the conviction of having profited by his exertions, and for the teacher as a means of ensuring that his instruction has not been profitless to his student. In this connection I cannot refrain from remarking that that genius for competition which has overridden our nation of England appears to me to be misplaced. Far too much is thought of the top man; very likely the second or even the tenth, or it may be the fiftieth, has a firmer grasp of his subject and in the long run would display more talent. Let us take comfort, however, in the thought that the day of examinations, for the sake of examinations, is approaching an end.

It may surprise many to learn that the suggestion that in England teachers do not usually examine their own pupils for degrees is, abroad, received in a spirit of surprise not unmixed with incredulity. Americans and Germans to whom I have mentioned this state of matters cannot realise that the teacher is not considered fit to be trusted to examine his own pupils, and, singular to state, they maintain that no one else can possibly do so with any attempt at fairness; it appears to them, as it appears to me, an altogether untenable position to hold that a man selected to fill an important professorship, after many years' trial in a junior position, should be suspected of such (shall I say) ambiguous ideas regarding common honesty that he will always arbitrate unfairly in favour of his own pupils. Such a supposition is an insult to the professor, and the exclusion of the teacher elevates examination to the position of a fetish; it is that, together with the spirit of emulation and competition, which has done so much to ruin our English education. The idea of competitive examination is so ingrained in the minds of Englishmen that it is difficult for them to realise that the object of a University is, not primarily to examine its pupils, but to teach them to teach themselves; and also they have still to acquire the conviction that students should be found, not merely among the *alumni* of the University, but also among all members of the staff. The spirit which should prevail with us should be the spirit of gaining knowledge—gaining knowledge, not for the satisfaction of one's own sense of acquisitiveness, but in order to be able to increase the sum total of what is known. All should work together, senior and junior staff, graduates and undergraduates, in order to diminish man's ignorance.

To sum up. As it exists at present, a University is a technical school for theology, law, medicine and engineering. It ought to be also a place for the advancement of knowledge, for the training of philosophers, of those who love wisdom for its own sake; and while as a technical school it exercises a useful function in preparing many men and women for their calling in life, its philosophical faculty should impart to those who enter its halls that faculty of increasing knowledge which cannot fail to be profitable, not only to the intellect of the nation, but also to its industrial prosperity. I regard this as the chief function of a University.